Vertical Turbine Solids-Handling Pumps (VTSH<sup>®</sup>)

# Fairbanks Morse Pentair Water

#### History/Development

The first Fairbanks Morse VTSH® Vertical Turbine Solids-Handling Pump became operational in New Orleans, LA in 1983. Since that time, Fairbanks Morse Pump has participated in hundreds of successful VTSH installations, proving the VTSH pump is built for heavy duty, trouble free and economically feasible applications and, significantly, is capable of playing a major role in solving the cost-control problems facing today's municipalities and industries.

VTSH pumps are available through 48" sizes, capacities from 5,000 to 80,000 GPM and heads to 120 feet. VTSH pumps are crafted in a facility dedicated to research, development and manufacturing of superior quality pumping equipment. Service and parts are available throughout the world from Fairbanks Morse and authorized distributors.

Village of Mamaroneck, New York Mamaroneck WWTP, 24" VTSH



City of Phoenix, Arizona 23rd Avenue WWTP 36" VTSH - Low Head Self Cleaning Trench Design

### Applications

VTSH pumps were specifically designed to handle large amounts of solids and long stringy materials, while maintaining a balanced hydraulic flow with low radial loading on the pump shaft and bearings. This, along with its rugged, heavy duty construction, results in less maintenance and longer service life.

Typical applications include raw sewage, return activated sludge, mixed liquor, primary effluent, secondary effluent, raw water and industrial waste.

Single-sump design eliminates the need for an additional or dry sump, suction piping, dehumidification and sump pumps, thereby dramatically reducing initial construction costs - a savings from 40 to 70 percent on total construction costs when compared with conventional wet-pit/dry-pit designs.

With a versatile, compact and streamlined design, the VTSH is a natural fit for space saving pump applications such as conventional wet wells, self-cleaning and confined wet wells. Self-cleaning wet wells can be configured into self-cleaning trench type with the pump parallel to the flow, and confined type with the pump alignment normal to the flow. The VTSH is ideally suited for both geometries and both are excellent for eliminating odors by ridding the wet well of heavy debris and floatables.

#### Features

Solids-handling impellers are designed with blunt, wellrounded leading vanes and a thick hydrofoil shape to ensure passage of large solids and long stringy materials. VTSH pumps are substantially more efficient over a broad capacity range than conventional solidshandling pumps. VTSH pumps can be used with a wide variety of standard above-ground drives, thus elminiating the need for submersible drives.

The discharge diffuser has three symmetrically arranged well-rounded vanes which serve to fully balance the radial hydraulic forces and eliminate the radial load of the impeller. Consequently, bending forces imposed on the shaft are virtually eliminated, resulting in long bearing life and a smooth, quiet operation.

The suction bell incorporates four guide vanes to streamline flow entering the impeller and the absence of a tail bearing eliminates any obstruction to the debris flowing to the impeller.

The entire length of column is furnished with an internal vertical splitter plate aligned with the vertical exits of the bowl vane. This splitter plate continues into the discharge connection, preventing trash accumulation on the shaft-enclosing tube. Either a surface or underground discharge connection can be provided.

Lineshaft and bearings are fully enclosed, separately lubricated and isolated from the pumped liquid.

# Coverage

The VTSH pump efficiency is high over a broad range. The best efficiency point (BEP) is located within the extreme right-hand portion of the curve where the bulk of the annual run-time of most solids-handling applications occurs. The hydraulic efficiency of the VTSH pump at BEP is from 6% to 8% higher than a conventional solids-handling design. The shape of the horsepower curve is relatively flat. Thus, the horsepower required at any point is very nearly the same as the horsepower required at BEP. The drive system, therefore, always operates near its best efficiency (full load). There is no need to pay for costly over-sizing in order to obtain a non-overloading drive system.



# Hydraulics

#	PUMP	SPEED
1	20" VTSH	880 RPM
2	20" VTSH	705 RPM
3	20" VTSH	585 RPM
4	16" VTSH	1180 RPM
5	16" VTSH	880 RPM
6	16" VTSH	705 RPM
7	14" VTSH	1180 RPM
8	14" VTSH	880 RPM
9	14" VTSH	705 RPM
10	10" VTSH	1770 RPM
11	10" VTSH	1170 RPM
12	10" VTSH	880 RPM
1		

#	PUMP	SPEED
1	48" VTSH	390 RPM
2	48" VTSH	350 RPM
3	48" VTSH	320 RPM
4	42" VTSH	440 RPM
5	42" VTSH	390 RPM
6	42" VTSH	350 RPM
7	36" VTSH	505 RPM
8	36" VTSH	440 RPM
9	36" VTSH	390 RPM
10	30" VTSH	585 RPM
11	30" VTSH	505 RPM
12	30" VTSH	440 RPM
13	24" VTSH	705 RPM
14	24" VTSH	585 RPM
15	24" VTSH	505 RPM

#	PUMP	SPEED
1	42" VTSH-LH	505 RPM
2	42" VTSH-LH	440 RPM
3	42" VTSH-LH	390 RPM
4	36" VTSH-LH	585 RPM
5	36" VTSH-LH	505 RPM
6	36" VTSH-LH	440 RPM
7	30" VTSH-LH	705 RPM
8	30" VTSH-LH	585 RPM
9	30" VTSH-LH	505 RPM
10	20" VTSH-LH	1180 RPM
11	20" VTSH-LH	880 RPM
12	20" VTSH-LH	705 RPM







### Applications





#### Fairbanks Morse Pump

In addition to our vertical turbine solids-handling (VTSH) pumps, Fairbanks Morse manufactures a broad range of pumps for public works and industrial installations, including dry pit and submersible solids-handling, horizontal and vertical splitcase, vertical turbine and propeller pumps, vortex and chopper pumps, and a complete line of FM-Approved and UL Listed fire pumps (both electric motor and diesel engine driven), and domestic jet and submersible well pumps.

Our 400,000 square foot manufacturing facility, located in the heart of the United States, provides advanced engineering and technology, a major testing facility for product performance evaluation, and computerized machining centers for high-quality manufacturing techniques. Fairbanks Morse sales and service facilities are located across the United States and throughout the world.

At Fairbanks Morse our longevity, engineered products, R&D programs, market leadership and customer service are the direct result of the quality and dedication of our personnel. Our skilled personnel average over 23 years of experience. Working as a team, our people are continuously exploring new and better ways to serve our customers. Product quality, dependability and innovation are all part of the Fairbanks Morse commitment to excellence.

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